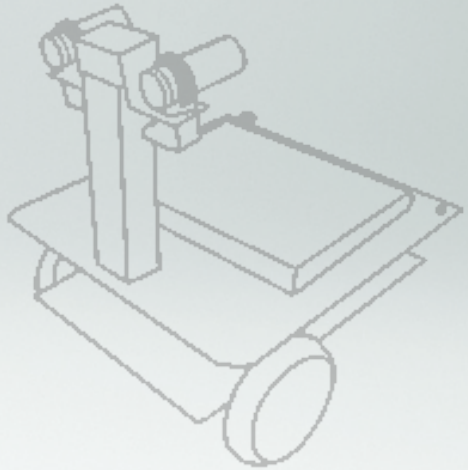
Testing a fully autonomous robot salesman in a real scenarios



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Team


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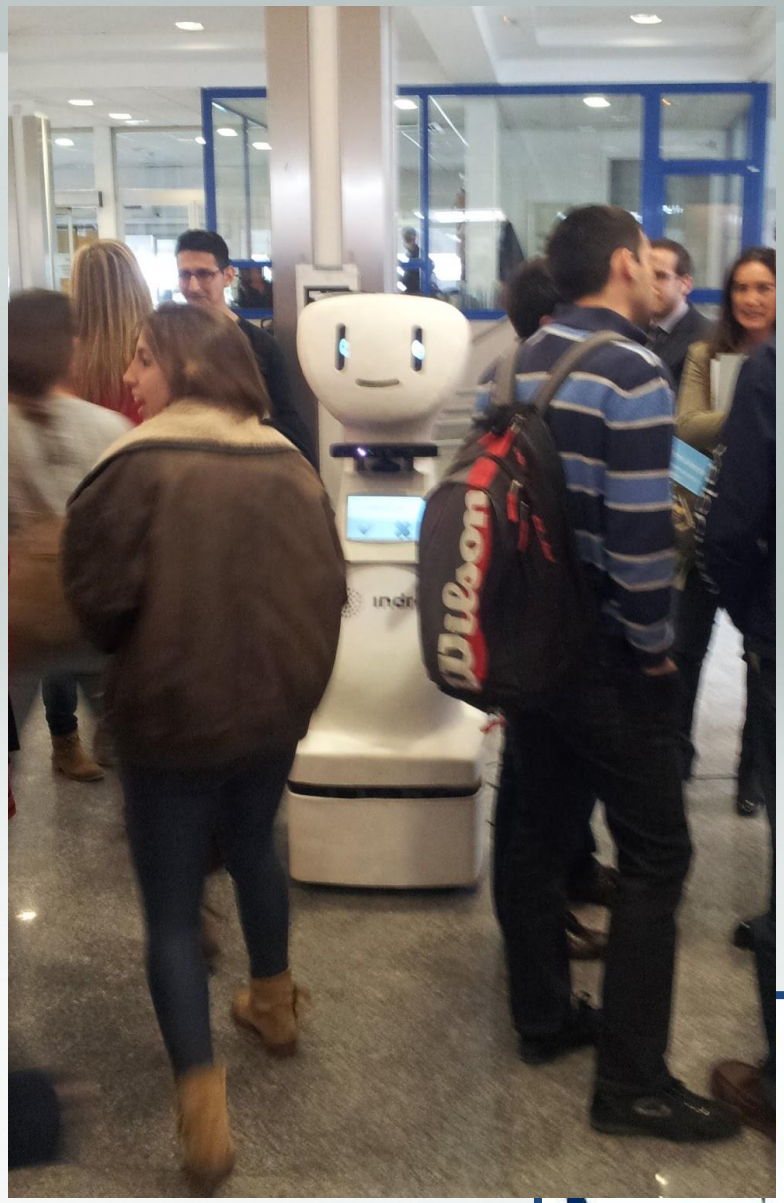
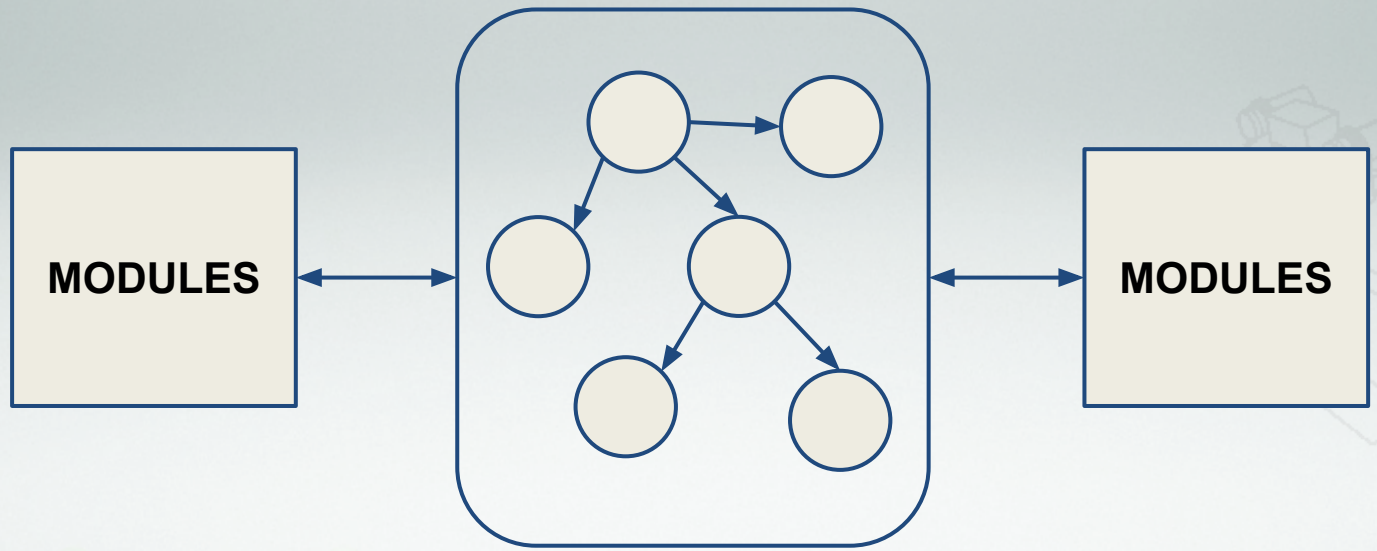
Introduction

- Robots in real scenarios
- Robots built to interact with people in a natural way
- Interaction against non-expert users
- Open-ended scenarios
- The challenge for the robot: changing the course of action in a short time lapse



Introduction

- To cope with this we develop RoboCog
- Task-Oriented modules that share and update a common representation of the world

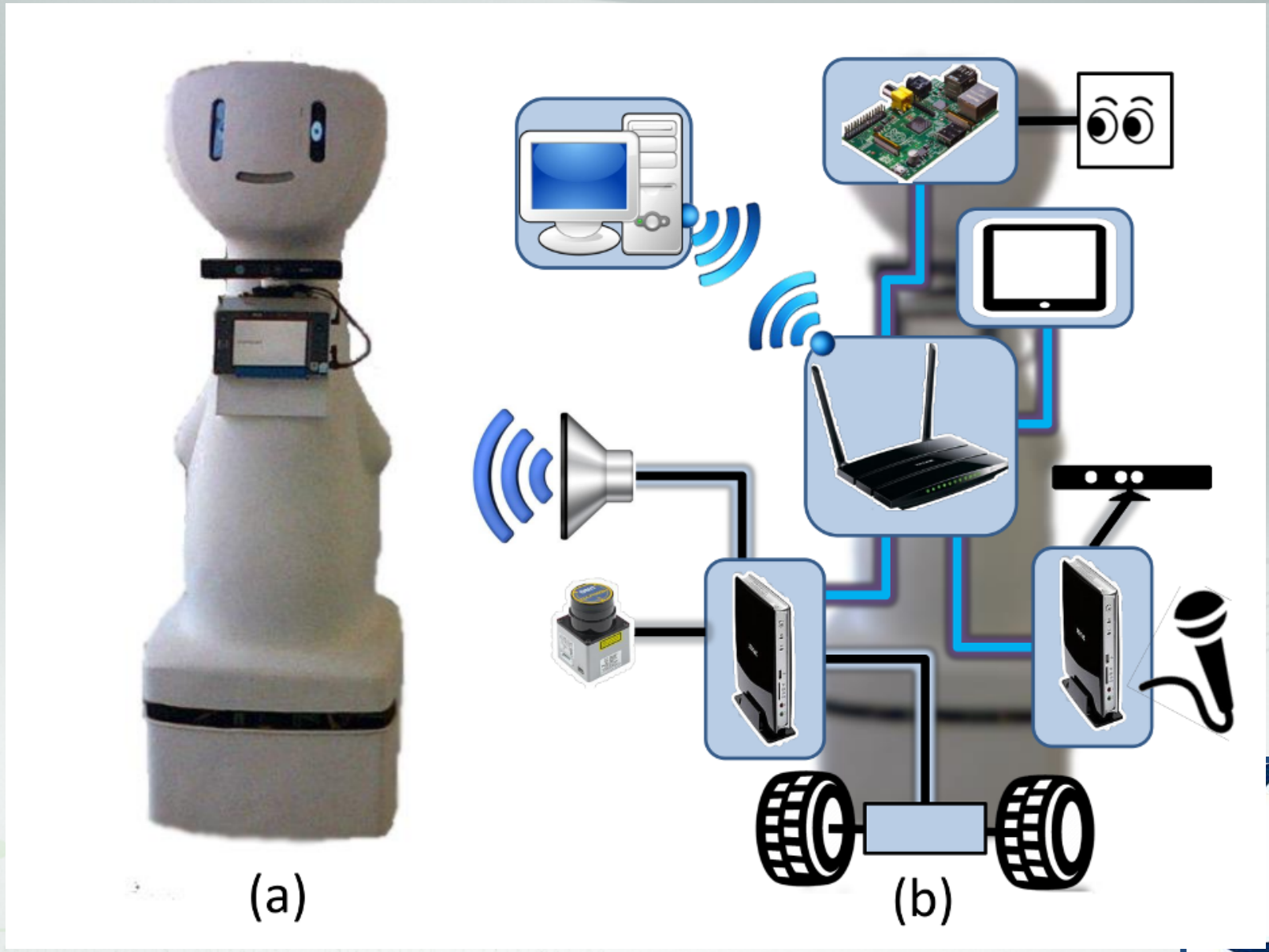


ADAPTA Scenario

Objective:

- The robot assumes the role of a **salesman**, that moves in a large shopping area and tries to convince potential clients to follow it to the interactive advertising panel
- The robot should work in uncontrolled, populated, dynamic environments
- The robot should be autonomous

Gualzru, the robot



Issues in preliminary tests

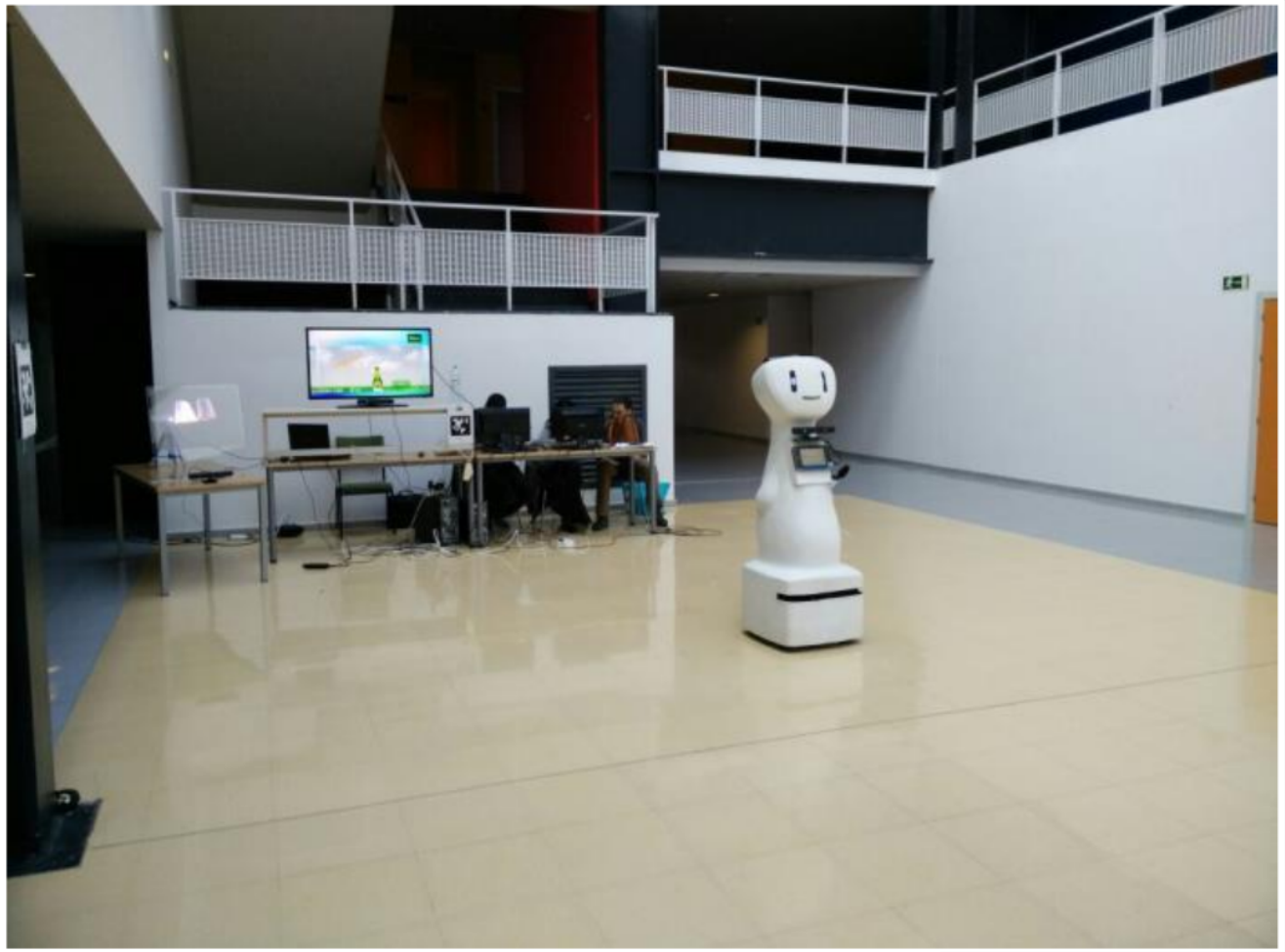
- Following people forever
- Getting lost after a while
- Unable to correctly hear/understand people in noisy environments
- ‘No’ means ‘no’
- Facing the person during the conversation
- Near mode required
- Slow approach, fast retreat.

Paper's target

- Test a robotic salesman in the context of the ADAPTA scenario
- How?
  - Testing the Gualzru's capabilities and limitations in real scenarios
  - Evaluating these capabilities through questionnaires
  - Condition: First time users
- Why?
  - Mainly to define future improvement actions

Experimental Setup

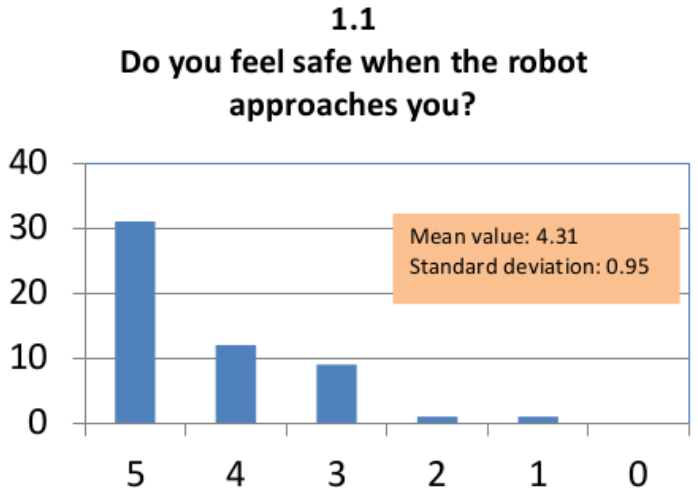
- Hall of the University of Málaga, 70 m^2
- 3 consecutive mornings
- Questionnaires similar to BEHAVE-II

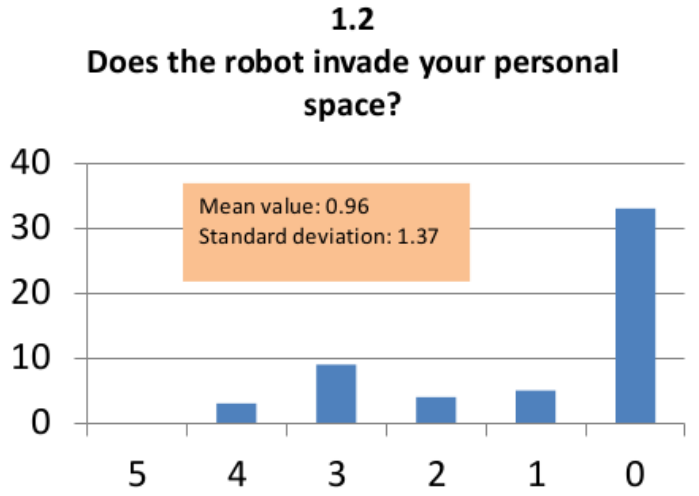


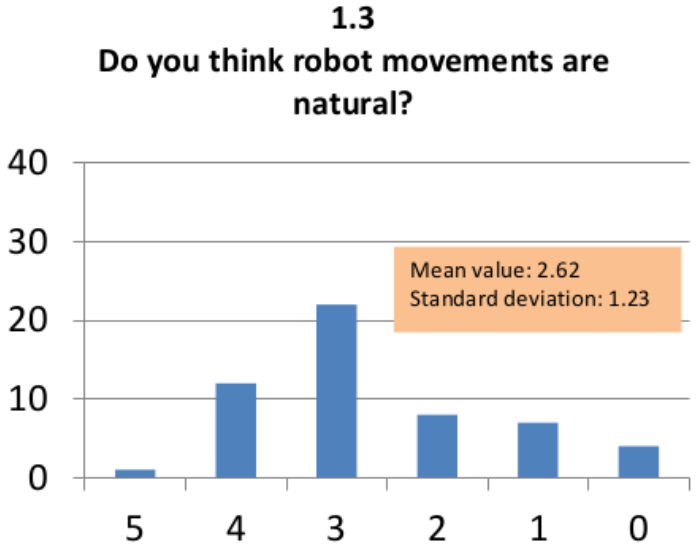
Experimental Setup

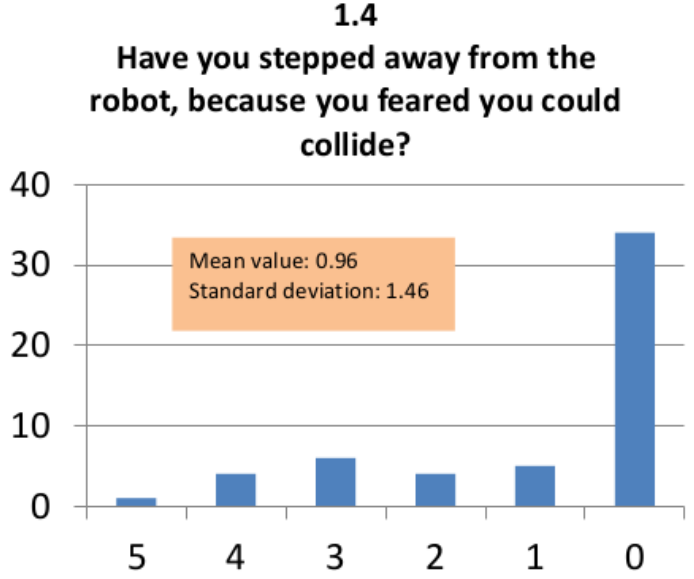
- Sample:
  - 50 random people
  - 16 questions
- 4 Blocks:
  1. Navigation
  2. Conversation
  3. Interaction
  4. Overall sensations

Navigation

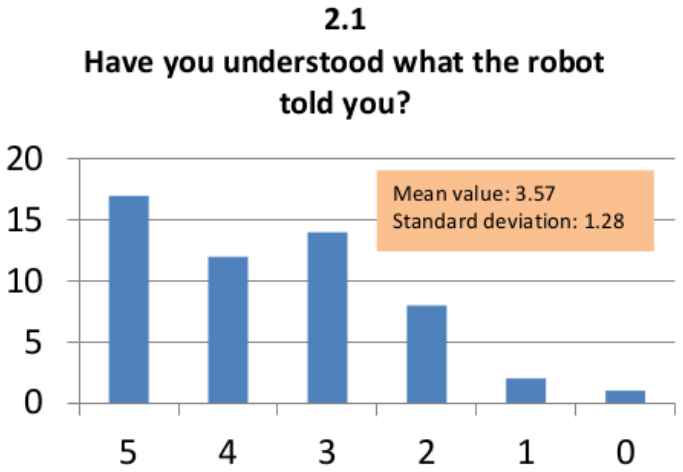

1.1
Do you feel safe when the robot approaches you?
Mean value: 4.31
Standard deviation: 0.95
40
30
20
10
0
5
4
3
2
1
0

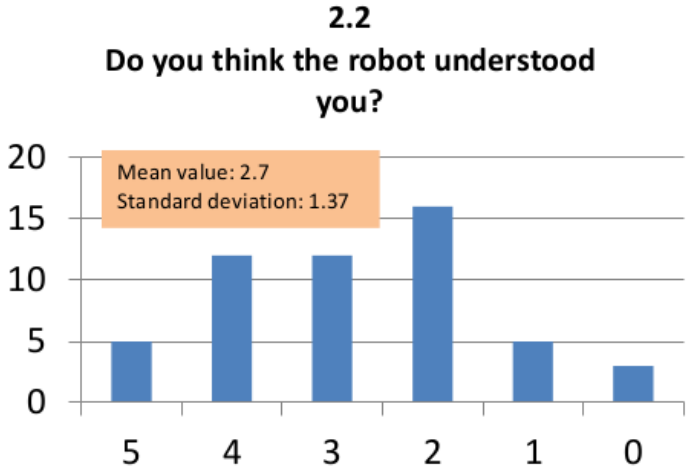

1.2
Does the robot invade your personal space?
Mean value: 0.96
Standard deviation: 1.37
40
30
20
10
0
5
4
3
2
1
0

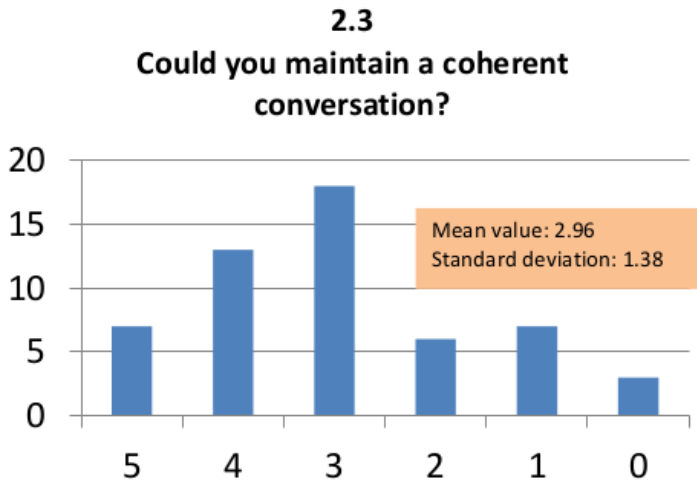

1.3
Do you think robot movements are natural?
Mean value: 2.62
Standard deviation: 1.23
40
30
20
10
0
5
4
3
2
1
0

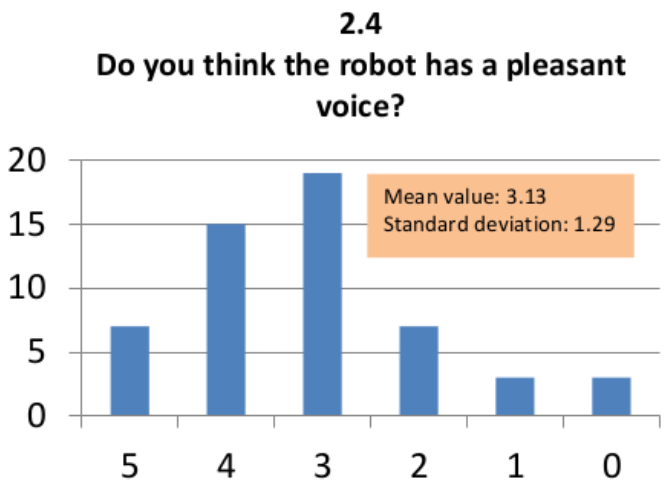

1.4
Have you stepped away from the robot, because you feared you could collide?
Mean value: 0.96
Standard deviation: 1.46
40
30
20
10
0
5
4
3
2
1
0

Conversation

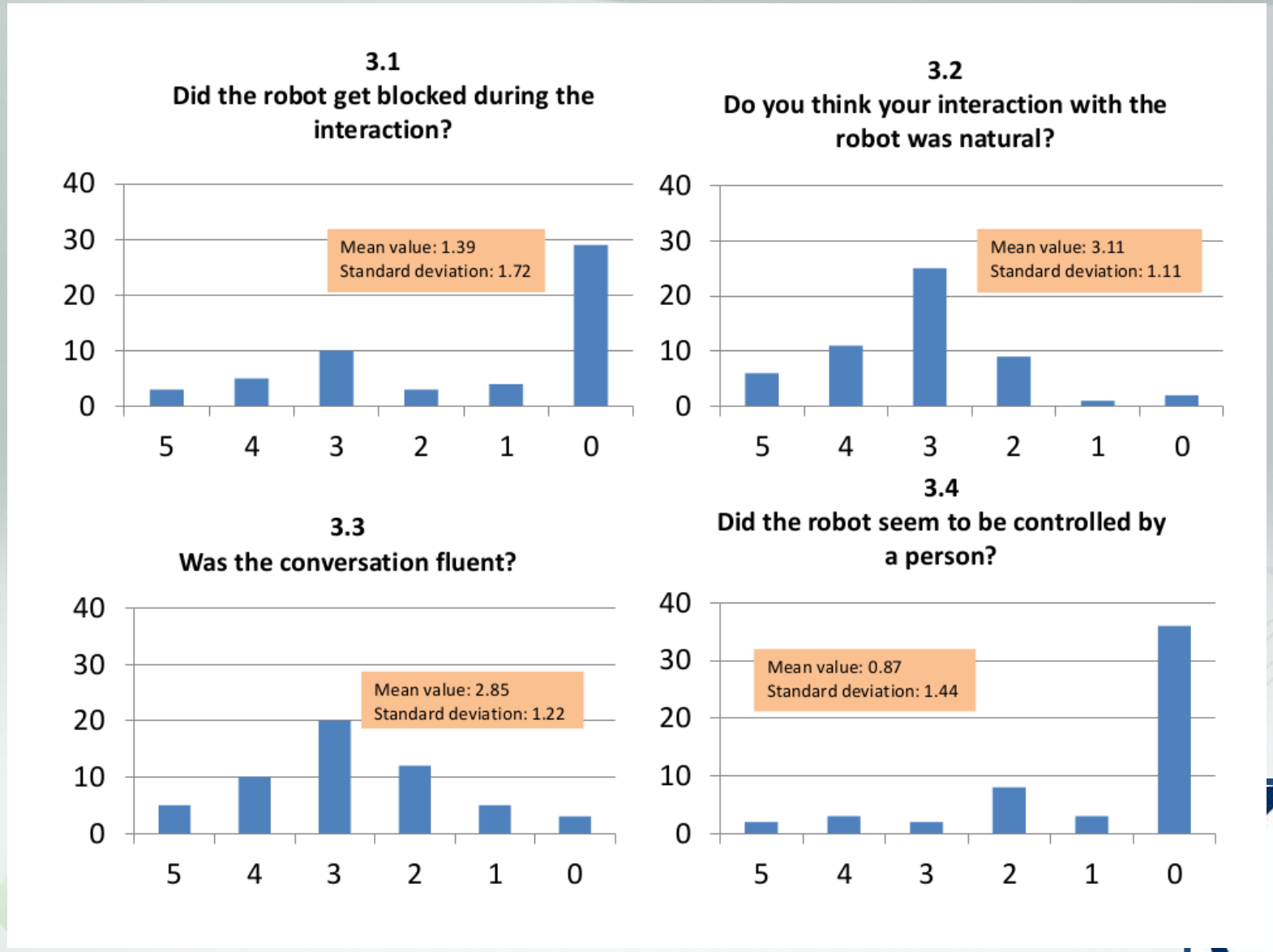




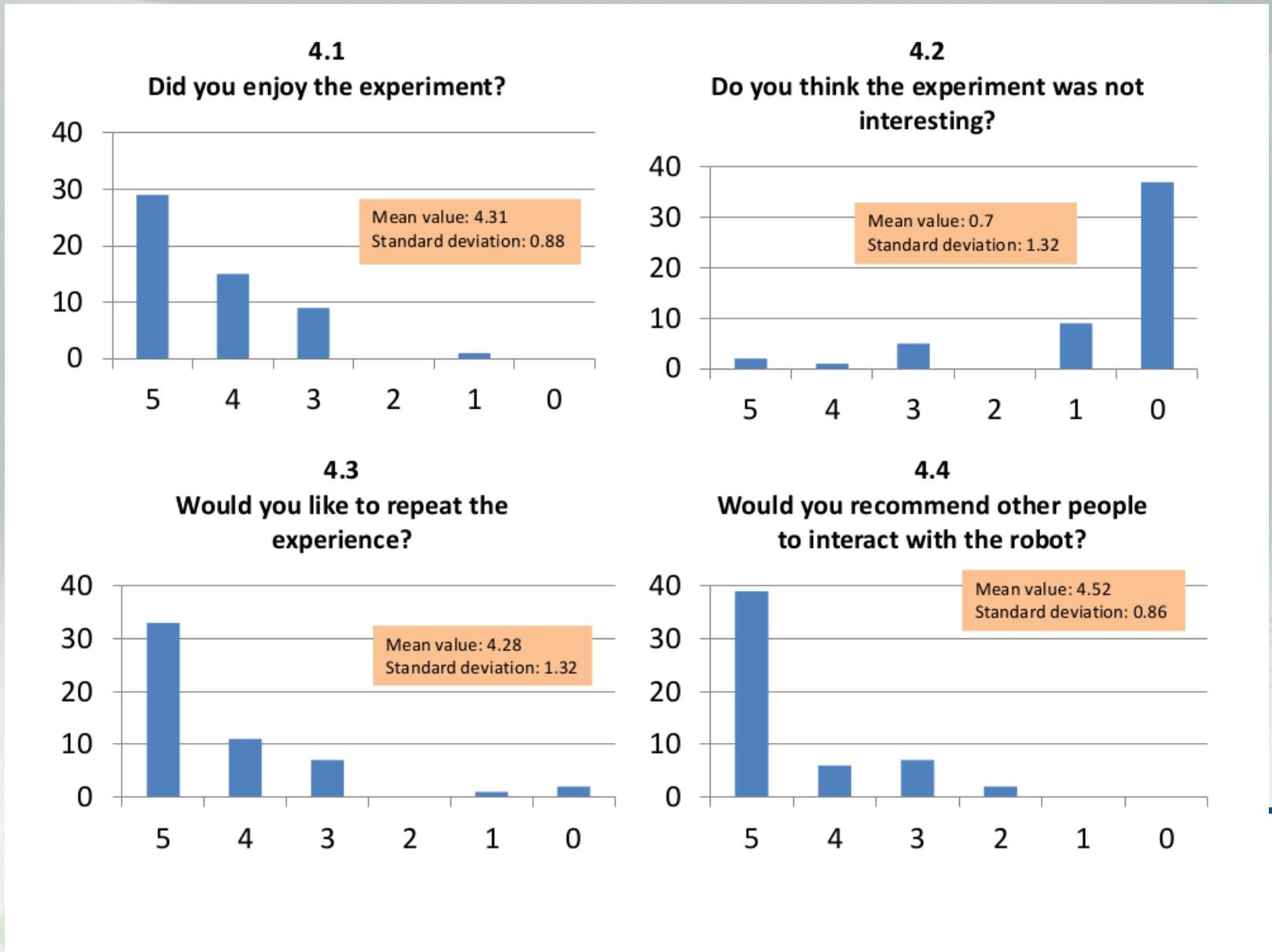




Interaction

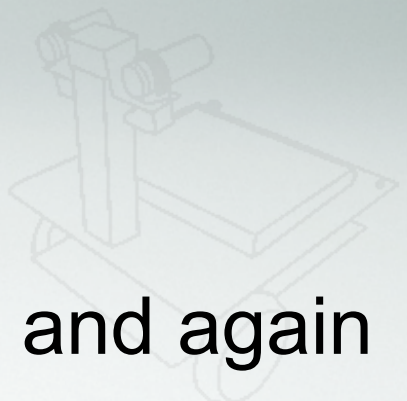


Overall sensations



Conclusion

- Behavioral:
  - The robot is perceived as safe an interesting
  - People enjoy the experience
  - Gualzru reacts coherently, from a human point of view, in nearly all situations
  - Limited in conversational abilities.
- Technical:
  - Gualzru works autonomously
  - Gualzru completes the task, again and again
  - Improve relocation process



Future work

- Improve conversational abilities
  - Improve speech recognition in noisy environments
  - Complementary interaction methods
    - We will add a touch screen as reinforcement
- Improve navigation abilities:
  - Add a RFID relocation, provided by a partner of the ADAPTA project
  - More natural and smoother motions

Questions